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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,768	04/27/2001	Yu Zhu	0020-4855P	2830

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EXAMINER	
JONES, STEPHEN E	

ART UNIT	PAPER NUMBER
2817	

DATE MAILED: 03/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/842,768	ZHU ET AL.	
	Examiner	Art Unit	
	Stephen E. Jones	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 24 February 2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 2-7 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 2-7 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 2-3 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Garland et al. (of record).

Garland et al. (Figs. 3A-4C) teaches a high frequency multi-layer substrate (e.g. including: a via hole (304); a via hole wire metal pad (305); a taper and narrow section of signal line (306a) (e.g. see Col. 4, lines 4-14) connects a signal line (306) and the pad (312) to each other to provide an impedance match everywhere along the signal path length (i.e. the matching inherently includes the signal line, via, pad and matching section); the pad (312), signal line and matching section are all on the same layer. Regarding Claim 3, note that the phrase "based on an adjusted width and length" is not given any patentable weight since the structure does not appear to be adjustable in the final product form (i.e. only the final product structure is patentable in an apparatus claim).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garland et al. in view of Scharfman (both of record).

Garland teaches an impedance matched structure as described above. However, Garland does not explicitly teach that the impedance matching circuit is formed of a plurality of different width lines connected in series.

Scharfman generally teaches that steps, tapers, and stubs are equivalently suitable impedance matching means (e.g. see Col. 2, lines 16-21).

It would have been considered obvious to one of ordinary skill in the art to have substituted steps (i.e. different width sections of signal line) such as suggested by

Scharfman in place of the taper and narrow section in the Garland device, because it would have been a mere substitution of art recognized functionally equivalent means for impedance matching the transmission length. Also, regarding claim 7, the phrase "based on adjusted widths and lengths" is not given any patentable weight (see the rejection of claim 3 above for details).

6. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garland in view of Roberts, Hayt, Jr. (Engineering Electromagnetics), and Scharfman (all of record).

Garland et al. teaches an impedance matched structure as described above. However, Garland does not explicitly teach that the impedance matching circuit is formed by an impedance matching transmission line and stubs on both sides on the impedance matching line.

Hayt, Jr. teaches that stubs are chosen to be placed at a position along the transmission line length to obtain the desired impedance characteristic.

Roberts teaches that dual stubs (i.e. stubs on opposite sides of a transmission line) permit for a high shunt capacitance and also teaches that the width and length are selected to provide desired impedance (e.g. see Col. 10, lines 50-59).

Scharfman generally teaches that steps, tapers, and stubs are equivalently suitable impedance matching means (e.g. see Col. 2, lines 16-21).

Accordingly, it would have been considered obvious to one of ordinary skill in the art to have substituted dual stubs on opposite sides of the transmission line at a particular distance on the transmission line (such as suggested by Roberts and Hayt) in

place of the narrow impedance matching line and taper (i.e. a stepped portion) in the Garland device (i.e. the combination resulting in a continuous transmission line having a portion between the via and the stub that can be considered the impedance matching transmission line in the same manner as the present invention, e.g. Fig. 4 of present invention), especially since Scharfman teaches that stubs, steps and tapers are functionally equivalent suitable means for impedance matching, and because the use of dual stubs would have optimized the impedance matching of the structure and would have provided the advantageous benefit of increased shunt impedance (e.g. see Roberts, Col. 10, lines 50-54). Regarding Claim 5, note that the phrase "based on adjusted width and length" is not given any patentable weight (e.g. see the rejection of Claim 3 above for details).

Response to Arguments

7. Applicant's arguments filed 2/24/04 have been fully considered but they are not persuasive.

With respect to Claim 2, Applicant argues that Garland does not teach a planar impedance matching circuit formed by an impedance matching transmission line, one end of which is connected to the via hole through a via hole metal pad and the other end of which is directly connected to the signal transmission line, each of which is located on the same circuit layer, and that Garland is not concerned with the impedance matching of the wire bond pad (305) or the impedance of the lead via (304), thus Garland does not teach impedance matching between the hole connecting portion and the signal line.

Applicant's arguments are not convincing. Garland teaches a signal line which includes an impedance matching narrowed lead section 306a having one end connected to the via through a pad and the other end connected to a wide portion of the lead 306, and the lead transmission line 306, via hole pad and the impedance matching narrowed section are all on the same layer of the structure. Garland further describes that the via is a "lead" via and the pad is a "lead" pad metallization. Since the via and pad are described as "lead" components Garland is thus teaching that the entire signal path from the wide portion of the lead to the wire bond pad is forming the "lead". Therefore Garland's teaching that the impedance is maintained everywhere along the length of the lead is teaching that the signal path is impedance matched throughout including the via. Furthermore, to have only the impedance matching along the narrowed portion 306a with the wide portion of the lead (as Applicant appears to be arguing) would not be a reasonable interpretation of what constitutes the impedance matching "everywhere along the length" (as described by Garland in Col. 3, lines 65-67 and Col. 4, lines 1, 11-14) because the via would have to be impedance matched also for the signal path to be impedance matched to thus avoid reflections that would be caused by the impedance mismatch of the entire lead structure (i.e. the signal path including the via).

Applicant further states that it is the pad (312) of Garland that is on the same layer as the lead (impedance matching layer) rather than the wirebond pad (305). The examiner agrees with this interpretation of the pad line item numbering of the Garland reference. However, since the pad (312) is in the signal path on the same layer as the

narrow portion of the line the claimed limitations are met by Garland as stated in the arguments and rejections above.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen E. Jones whose telephone number is 571-272-1762. The examiner can normally be reached on Monday through Friday from 8 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Pascal can be reached on 571-272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stephen Jones
Patent Examiner
Art Unit 2817

SEJ